UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,450	10/23/2003	Ajay Kapur	RD-28357-1	8030

41838 7590 03/20/2008

GENERAL ELECTRIC COMPANY (PCPI)
C/O FLETCHER YODER
P. O. BOX 692289
HOUSTON, TX 77269-2289

EXAMINER	
WANG, CLAIRE X	
ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
03/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/692,450	KAPUR ET AL.	
	Examiner	Art Unit	
	CLAIRE WANG	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,20-26* is/are rejected.

7)☐ Claim(s) *17-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicants' response to the last Office Action, filed on December 7th, 2007 has been entered and made of record.

2. Applicant's amendment of claim 12 has necessitated new grounds of rejection. Thus, new grounds of rejection are presented in this Office Action.

Response to Arguments

3. Applicant's arguments filed December 7th, 2007 have been fully considered but they are not persuasive.

a. In response to applicant's remark that "Leichter is completely silent about any kind of coordinates". It is noted that Leichter teaches "the location of the selected region of interest is communicated to a computer processor" (Paragraph [0038], lines 8-9). It is also noted that in order for the location to be communicated to a computer, a coordinate system must be used. Thus, Leichter's location of the region of interest reads on the claimed coordinate system.

b. In response to applicant's remark that "Leichter does not teach using the coordinates of the ROI to scan the object with a second imaging system." It is noted that Leichter only teaches finding the coordinates of the ROI by finding the location of the ROI (Paragraph [0038], lines 8-9). Wang teaches using two image systems to scan a ROI ([0044], lines 5-8).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-6, 8-15, 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leichter et al. (US 2004/0086158 hereinafter "Leichter") in view of Wang et al. (US 2003/0007598 hereinafter "Wang").

As to claim 1, Leichter teaches a method for viewing an abnormality in different kinds of images (display for computer-aided diagnosis of mammograms; Title), said method comprising: scanning an object using a first imaging system to obtain at least a first image of the object (creating mammographic image; 310 Fig. 4A); determining coordinates of a region of interest (ROI) visible on the first image (the location of the selected region of interest is communicated to a computer processor; Paragraph [0038], lines 8-9), wherein the ROI includes the abnormality (user-selected ROI is displayed in conjunction with malignancy; [0050], lines 9-13). However, Leichter does not teach using the coordinates of the ROI to scan the object with a second imaging system. Wang teaches a breast cancer screening system that uses both x-ray mammograms and ultrasound. Wherein the system performs a CAD algorithm that corresponds the ROI in the x-ray mammogram view with the ultrasound view ([0044], lines 5-8). Thus, Wang reads on the claimed using the coordinates of the ROI in one system for second

imaging system. Therefore, it would have been obvious for one ordinarily skilled in the art at the time the invention was made to combine Leichter's X-ray display system with Wang's second view using an ultrasound viewing system in order to promote volumetric thoroughness of the scan (Wang [0029], lines 7-9).

As to claim 2, Leichter teaches wherein determining coordinates of the ROI visible on the first image comprises manually marking the ROI on a display device that displays the first image (input device to select a region of interest directly on the displayed digitized image; [0038], lines 6-8).

As to claim 3, Leichter teaches wherein determining coordinates of the ROI visible on the first image comprises automatically marking the ROI by using a computer-aided design (CAD) algorithm (CAD method and system; [0050], lines 4-8).

As to claim 4, Wang teaches wherein using the coordinates of the ROI to scan the object with a second imaging system comprises: instructing a probe mover to move a probe to the co-ordinates to scan a specific region of the object, wherein the specific region is defined by the coordinates; and scanning the specific region of the object with the second imaging system to obtain at least one second image (a mechanical translation mechanism moves the ultrasound probe across the breast as ultrasound scans are taken; [0030], lines 7-9).

As to claim 5, Wang teaches displaying the first and the second images concurrently to enable a user to view the abnormality (the ultrasound display has one or more adjunct display monitors positioned near the x-ray mammogram display so the radiologist is able to view both at the same time; [0033], lines 7-13).

As to claim 6, Wang registering 2-dimensional (2D) data from which the first image is generated with 3-dimensional (3D) data obtained by scanning the object with the second imaging system (the operator is able to select from a number of slices and view that slice as a 3-D view; [0133], lines 15-17).

As to claim 8, it is the same as claim 1. The only difference is that Claim 8 is a system claim, whereas claim 1 is a method claim. Therefore, claim 8 is analyzed in the same way as claim 1. Please see above for details.

As to claim 9, it is the same as claim 2. The only difference between the two claims is that claim 2 is a method claim and claim 9 is a system claim. Therefore, claim 9 is analyzed in the same way as claim 2.

As to claim 10, it is the same as claim 3. The only difference between the two claims is that claim 3 is a method claim and claim 10 is a system claim. Therefore, claim 10 is analyzed in the same way as claim 3.

As to claim 11, Wang teaches instructing an ultrasound probe mover to move the ultrasound probe, in order to obtain at least one ultrasound image (a mechanical translation mechanism moves the ultrasound probe across the breast as ultrasound scans are taken; Wang [0030], lines 7-9).

As to claim 12, it differs from claim 1 in that claim 12 further teaches registering 3-dimensional (3D) data relative to 2-dimensional (2D) data, wherein the 3D data is obtained using the second imaging system and the 2D data is obtained using the first imaging system (Wang teaches scanning the ROI using both X-ray and ultrasound wherein the X-ray is the 2D data generator and the ultrasound is the 3D image generator; [0044], lines 1-8).

As to claim 13, Wang teaches wherein registering 3D data relative to 2D data comprises registering 3D data relative to 2D data without using fiducial marks on a patient having the abnormality (correlating the ROI using nipple distance information; [0044], lines 10-19).

As to claim 14, Wang teaches wherein registering 3D data relative to 2D data comprises registering 3D data acquired using an ultrasound imaging system relative to 2D data acquired using an X-ray imaging system (Wang teaches scanning the ROI using both X-ray and ultrasound wherein the X-ray is the 2D data generator and the ultrasound is the 3D image generator; [0044], lines 1-8).

As to claim 15, Wang teaches establishing a relationship between the 3D data acquired using the ultrasound imaging system and the 2D data acquired using the X-ray imaging system (Wang teaches scanning the ROI using both X-ray and ultrasound wherein the X-ray is the 2D data generator and the ultrasound is the 3D image generator; [0044], lines 1-8).

As to claim 21, it is the same as claim 1. The only difference between the two claims is claim 21 further teaches of instructing an ultrasound probe mover to move the ultrasound probe, in order to obtain at least one ultrasound image (a mechanical translation mechanism moves the ultrasound probe across the breast as ultrasound scans are taken; Wang [0030], lines 7-9).

As to claim 22, it is the same as claim 2. Therefore, claim 22 is analyzed in the same way as claim 2.

As to claim 23, it is the same as claim 3. Therefore, claim 23 is analyzed in the same way as claim 3.

As to claim 24, it is the same as claim 21. The only difference is that Claim 24 is a system claim, whereas claim 21 is a method claim. Therefore, claim 24 is analyzed in the same way as claim 21.

As to claim 25, it is the same as claim 21. The only difference between the two claims is claim 25 fails to teach the scanning and determining coordinates part of claim 21. Also, claim 25 is a system whereas claim 21 is a method. However, Leichter in view of Wang still read on claim 25. Therefore, it will be analyzed in the same way as claim 21.

6. Claims 7, 16, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leichter view of Wang further in view of Fu et al. (US 2005/0047544 A1) (from this point forward will be referred to as Fu).

As to claim 7, Leichter does not teach wherein registering 2D data from which the first image is generated with 3D data comprises: obtaining at least six equations having at least six unknowns, wherein each equation establishes a relationship between coordinates of 2D data acquired from the first imaging system and coordinates of 3D data acquired from the second imaging system; and solving the six equations to obtain the six unknowns. Fu teaches the differences in the position and orientation of the anatomical target images within radiographs correspond to the difference in the 3D position with in a target 3D coordinate frame are solved by finding the parameters (s, y, z, r, p, w). Thus Fu's parameters read on the claimed 6 unknowns. Therefore, it would have been obvious to one ordinarily skilled in the art at the time of the invention to combine Leichter's X-ray and ultrasound system with Fu's correlation parameters in order to have a precise and rapid way to register 2D images with 3D scan data (Fu [0009] lines 1-3).

As to claim 16, it is the same as claim 7. The only difference between the two claims is claim 16 further teaches that 2D data is gathered using an X-ray and the 3D data is gathered using an ultrasound (Wang teaches performing an ultrasound scan; 1512 Fig. 15-1). Therefore, claim 16 is analyzed in the same way as claim 7.

As to claim 20, Fu teaches obtaining six additional equations having six additional unknowns, wherein each of the six additional equations establishes a relationship between coordinates of 2D data acquired from the X-ray imaging system and coordinates of 3D data acquired from the ultrasound imaging system; solving the six additional equations to obtain the six additional unknowns; and averaging a first unknown of the six unknowns with a corresponding first additional unknown of the six additional unknowns (Fig. 3 shows the different ways of finding an relating the 6 unknowns through multi-dimensional matching).

As to claim 26, it is the system claim of 7. Therefore, claim 26 is analyzed in the same way as claim 7.

Allowable Subject Matter

7. Claims 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 17, the innovation distinction that makes the claim allowable is the three equations defined by the claim.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CLAIRE WANG whose telephone number is (571)270-1051. The examiner can normally be reached on Mid-day flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Claire Wang
03/15/2008

/Matthew C Bella/
Supervisory Patent Examiner, Art Unit 2624